

Tocopherol Acetate during the Treatment of Primary Intrathoracic Pediatric Tuberculosis

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Abstract

The patients of 1-14 age with intrathoracic Tuberculosis had treatment by tocoferol-acetate with the DOTS therapy as well, i.e. below 5 years - 50mg per day, for more than 5 years - 100mg per day. The control group included 50 patients. The treatment for them was accomplished by the standard method. The effectiveness of the treatment was defined by intensity of signals that are characteristic for blood's electroparamagnetic centers oxidation process. According to the research, it was clarified, that the tocoferol acetate decreases the disbalance between pro- and antioxidant systems during primary pediatric intrathoracic tuberculosis and have antioxidant treatment effect.

Keywords: *tocopherol acetate, children, tuberculosis, oxidative processes*

Introduction

During last ten years there were made huge changes for understanding the meaning of tuberculosis. According to the World Health Organization Protection and a number of authors, it was caused by the morbidity, mortality and extension of multi resistant forms of TB. Over this same period, TB has ranked first as a cause of deaths worldwide related to an infectious agent and accounts for about 40% of the deaths related to HIV worldwide (190).

According to the current point of view, lipids' Peroxidation that takes place by free radical way is one of the important mechanisms of regulation of cells membrane condition. Lipids peroxidation processes are kept by the antioxidant system at the optimal level. When the Lipids Peroxidation processes are importantly strengthened and the activation of antioxidant system is decreased, the disbalance takes place among them and it is followed by damage of lipids peroxidation structure and function and development of pathologic process.

As it was mentioned in previous reports, during the disbalance of regulation between pro and antioxidant systems take place. It is expressed by the activeness of free radical processes and decrease of antioxidant systems. It is the factor that causes hypoxia.

According to above mentioned the goal of this report is define the treatment effect and activeness of antioxidant tocoferol acetate on the oxidation processes during primary pediatric tuberculosis.

Material and Methods

110 patients, 1-14 of age those were diseased by primary pediatric intrathoracic tuberculosis were investigated. There were accomplished clinic, laboratory and radiological researches as well as blood oxidation processes paramagnetic centers: Fe^{2+} , Mn^{2+} , Mo^{5+} complexes, met hemoglobin, inactivated form of adrenergic receptors, spin trapped free nitric oxide - NO and its toxic metabolites - FESNO and HbNO's electro paramagnetic (EPR) signals. The research was accomplished at the radiospidometer PЭ 1307 liquid oxide $t=77$ degrees of temperature. For researching

nitric oxide, natrium dietilditio carbonate was added to the blood of patients in vitro.

All the patients were divided into two groups: I group consisted 60 patients that was accomplished not only antituberculosis chemical therapy - DOTS (Directly observed treatment short-course), but also were treated by tocoferol-acetate's 50% oil liquid during 1 month. Below the age of 5, - 50mg per os, and above 5 years of age - 100 mg per day. II group consisted of 50 patients that were treated only by standard method. The research was accomplished twice, by tocoferol before treatment; after 1 month from finishing the treatment, in I group and at the same data for the patients of II group. The treatment was worked out at the computer program - SPSS (Statistical Package for Social Sciences).

Results

The table shows paramagnet centers changes in the blood of the patients with PPIT that express oxidation processes during the treatment.

According to the table it is mentioned that in both groups there was developed the decrease of EPR signals intensively ($P < 0,000$) of promoters of free radical oxidation: Fe^{2+} , Mn^{2+} , Mo^{5+} , MetHb. The same changes appeared at the signal that is the characteristic of adrenoreceptors inactive form ($g=2,01$, that had effect on cell's membrane destruction. Also, nitric oxide and its toxic ingredients FeSNO and HbNO EPR signals were decreased ($p < 0,000$). According to the above mentioned tocoferol acetate decreases the intensively of free radicals and strengthens activity of antioxidant ferments. This makes the disbalance of oxidant and antioxidant systems to be decreased. Thus, tocoferol-acetate has the positive treatment effect by having influence on pathogenetic circle during the primary pediatric tuberculosis.

Conclusion

During the PPIT to use the tocoferol - acetate by making active antioxidant ferment's activity causes decrease of disbalance between pro- and antioxidant systems and antioxidant treating effect.

	N		Mean				Std. deviation		Std. Error mean		p	
	I gr.	II gr.	I gr.		II gr.		I gr.	II gr.	I gr.	II gr.	I gr.	II gr.
			Before treatment	After treatment	Before treatment	After treatment						
NO	60	50	25,10	21,94	25,67	18,37	4,99	5,83	0,71	0,75	0,000	0,000
FeSNO $g=2,03$	60	50	22,02	19,22	21,63	13,70	4,81	34,29	0,68	0,55	0,000	0,000
HbNO $g=2,01$	60	50	22,22	18,75	20,33	14,5	4,13	5,05	0,59	0,65	0,000	0,000
Fe^{2+} $g=2,2$	60	50	70,51	33,84	70,52	43,80	23,76	29,20	3,07	4,13	0,000	0,000
Mn^{2+} $g=2,14$	60	50	18,72	11,92	18,28	15,17	3,42	3,75	0,44	0,53	0,000	0,000
Mo^{5+} $g=1,97$	60	50	15,12	9,52	12,04	9,87	3,69	2,87	0,48	0,41	0,000	0,000
MetHb $g=6,0$	60	50	23,81	15,66	21,99	18,46	5,00	3,68	0,65	0,52	0,000	0,000
$g=2,01$	60	50	2,06	1,83	2,01	1,94	0,33	6,23	4,264 E-102	3,242 E-02	0,017	0,000
Cp	60	50	27,38	21,10	25,92	25,93	5,54	7,9	0,72	1,18	0,099	0,000
Fe^{3+} transf.	60	50	19,54	26,08	21,13	21,88	5,03	6,67	0,86	0,71	0,089	0,000
NO in serum	60	50	25,75	22,94	25,71	16,08	5,18	6,78	0,73	0,88	0,000	0,000
NO in everyth.	60	50	23,81	20,92	24,56	15,97	3,82	7,85	0,54	0,54	0,000	0,000

Tab.1 Changes of the blood paramagnetic centers that express oxidation processes during treatment in children with PPIT.

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Применение токоферола ацетата при лечении первичного педиатрического туберкулеза

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РЕЗЮМЕ

Совместно с DOTS терапией в течении одного месяца проведено лечение туберкулеза 60 детям 1-14 летнего возраста токоферол ацетатом *per os*. До пятилетнего возраста 50 мг/день, после 5 лет - 100 мг/день. 50 пациентов составили контрольную группу, где лечение проводилось только стандартным методом. Эффективность лечения определялась посредством интенсивности сигналов электропарамагнитных центров крови, характеризующих окислительные процессы. Исследование показало, что токоферол ацетат способствует уменьшению антиоксидантного дисбаланса при первичном педиатрическом интраторакальном туберкулезе и создает антиоксидантный лечебный эффект.

Ключевые слова: *токоферол ацетат, туберкулез, антиоксидантный эффект*